

CLAIMS

1. A hermetically sealed compressor comprising:
 - a sealed vessel filled with a coolant and a freezer oil;
 - 5 an electromotive element including a rotor and a stator and accommodated within the sealed vessel;
 - a compressing element accommodated within an upper region of the sealed vessel and adapted to be driven by the electromotive element, the compressing element being provided with a shaft, arranged so as to extend
 - 10 vertically and having the rotor mounted thereon, and a bearing for supporting the shaft;
 - a first oil pump provided in a lower portion of the shaft and opening into the freezer oil;
 - a second oil pump provided above the first oil pump and formed by a
 - 15 spiral groove, provided on an outer periphery of the shaft, and an inner peripheral wall surface of the rotor; and
 - a third oil pump provided above the second oil pump and formed by a spiral groove, provided on the outer periphery of the shaft, and an inner peripheral surface of the bearing.
- 20 2. The hermetically sealed compressor as claimed in Claim 1, wherein the spiral groove of the second oil pump and the spiral groove of the third oil pump are formed continuously.
3. The hermetically sealed compressor as claimed in Claim 2, wherein the spiral groove of the second oil pump and the spiral groove of the third oil pump
- 25 open in communication with a first gap formed between the rotor and the bearing.
4. The hermetically sealed compressor as claimed in Claim 3, wherein the first gap is 0.5 mm or smaller over the entire circumference thereof.
5. The hermetically sealed compressor as claimed in Claim 2, wherein

the rotor has an upper end face formed with a bore for receiving the bearing and a second gap is formed between an inner peripheral surface of the bore and an outer peripheral surface of the bearing.

6. The hermetically sealed compressor as claimed in Claim 5, wherein
5 the second gap is 1.0 mm or smaller over the entire circumference thereof.

7. The hermetically sealed compressor as claimed in Claim 5 or 6,
wherein the bore has a depth of 5.0 mm or larger.

8. The hermetically sealed compressor as claimed in Claim 3, further
comprising an axially elastically deformable washer interposed in the first gap.

10 9. The hermetically sealed compressor as claimed in Claim 3, wherein
the rotor has a center of magnetism displaced below a center of magnetism of the
stator and the first gap becomes almost zero over the entire circumference thereof
when the rotor ascends by a magnetic force of attraction during operation.

10. A hermetically sealed compressor comprising:

15 a sealed vessel filled with a lubricant oil;

an electromotive element including a rotor and a stator and
accommodated within the sealed vessel;

a compressing element accommodated within the sealed vessel and
adapted to be driven by the electromotive element, the compressing element being
20 provided with a shaft, having an eccentric shaft portion and a main shaft portion,
and a main bearing for supporting the shaft;

a first oil pump provided in a lower portion of the shaft and opening
into the lubricant oil;

a second oil pump provided above the first oil pump and formed by a
25 spiral groove, provided on an outer periphery of the shaft, and an inner peripheral
wall surface of the rotor; and

a third oil pump provided above the second oil pump and formed by a
spiral groove, provided on the outer periphery of the shaft, and an inner peripheral

surface of the main bearing;

wherein the electromotive element is a bipolar permanent magnet electric motor including a permanent magnet built in a rotor iron core of the rotor.

11. The hermetically sealed compressor as claimed in Claim 10, wherein
5 the main bearing does not intersect a plane containing one end of the rotor iron core adjacent the compressing element and lying generally perpendicular to a longitudinal axis of the main shaft.

12. The hermetically sealed compressor as claimed in Claim 10 or 11,
further comprising an auxiliary shaft portion provided coaxially of the main shaft
10 portion with the eccentric shaft portion intervening between it and the main shaft portion, and an auxiliary bearing for supporting the auxiliary shaft portion.

13. The hermetically sealed compressor as claimed in any one of Claims
10 to 12, wherein the bipolar permanent magnet electric motor is a self-starting
permanent magnet synchronous motor including a rotor having a plurality of
15 conductor bars of a starter cage conductor in an outer periphery of the rotor iron core and also having a plurality of permanent magnets embedded within the rotor iron core.

14. The hermetically sealed compressor as claimed in any one of Claims
10 to 13, wherein each of the permanent magnet is in the form of a rare earth
20 magnet.